



SEQUENCE LISTING

<110> Furusawa, Mitsuru

<120> METHOD AND SYSTEM FOR RAPIDLY CONFERRING
A DESIRED TRAIT TO AN ORGANISM

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<140> 10/810,486

<141> 2004-03-26

<150> US 10/684,141

<151> 2003-10-10

<150> JP 2003-092898

<151> 2003-03-28

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<170> PatentIn Ver. 2.1

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	2130	2135
		2140
His Leu Ile Gln Lys Leu Arg Ser Asp Ile Glu Ser Tyr Leu Ile Gln		
2145	2150	2155
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Asp Leu Arg Cys Ser Arg Cys His Lys Val Lys Arg Asp Tyr Met Ser		

	2165		2170		2175
Ala	His	Cys	Pro	Cys	Ala
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 1 5 10

<210> 7
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 <213> *Salmonella typhimurium*

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<213> *Streptomyces coelicolor*

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<210> 20
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<213> *Saccharomyces cerevisiae*

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<213> *Mus musculus*

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<213> *Homo sapiens*

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<213> *Homo sapiens*

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<213> *Oryza sativa*

<400> 25

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1 5 10

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<213> Arabidopsis thaliana
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1 5 10

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<210> 27
<211> 12
<212> PRT
<213> Arabidopsis thaliana
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<400> 27
Val Cys Ala Phe Asp Ile Glu Thr Val Lys Leu Pro
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<211> 12
<212> PRT
<213> Rattus norvegicus
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<213> Bos taurus
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<400> 29
Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

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<210> 30
<211> 12
<212> PRT
<213> Glycine max
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1 5 10

<210> 31

<211> 12
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 <213> Drosophila melanogaster

<400> 31
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<210> 32
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<210> 35
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Mutated pol epsilon

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<210> 36
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 <212> DNA
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<210> 39
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<212> DNA

<213> Escherichia coli

<400> 41

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<210> 42

<211> 243

<212> PRT

<213> Escherichia coli

<400> 42

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          20             25             30

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Ile	Gly	Ala	Val	Glu	Val	Val	Asn	Arg	Arg	Leu	Thr	Gly	Asn	Asn	Phe	
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65					70					75					80	
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		180						185					190			
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	210					215					220					
His	Glu	Ala	Arg	Leu	Asp	Leu	Val	Gln	Lys	Lys	Gly	Gly	Ser	Cys	Leu	
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<211> 4866

<212> DNA

<213> *Bacillus subtilis*

<400> 43

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<211> 1437

<212> PRT

<213> *Bacillus subtilis*

<400> 44

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Glu Ile Lys Lys Leu Thr Ile His Lys Ala Ser Lys Ser Trp His Phe
          35           40           45
His Phe Gln Phe Lys Ser Leu Leu Pro Phe Gln Ile Tyr Asp Thr Leu
          50           55           60
Thr Thr Arg Leu Thr Gln Ser Phe Ala His Ile Ala Lys Val Thr Ser
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          130          135          140
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Thr Leu Cys Ile Phe Lys Ile Thr Asp Tyr Thr Asn Ser Ile Leu Ile
          260          265          270
Lys Met Phe Ala Arg Glu Lys Glu Asp Ala Ala Leu Met Lys Ser Leu
          275          280          285

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Lys	Lys	Gly	Met	Trp	Val	Lys	Ala	Arg	Gly	Ser	Ile	Gln	Asn	Asp	Thr	290	295	300
Phe	Val	Arg	Asp	Leu	Val	Met	Ile	Ala	Asn	Asp	Val	Asn	Glu	Ile	Lys	305	310	315
Ala	Lys	Thr	Arg	Glu	Asp	Ser	Ala	Pro	Glu	Gly	Glu	Lys	Arg	Val	Glu	325	330	335
Leu	His	Leu	His	Ser	Pro	Met	Ser	Gln	Met	Asp	Ala	Val	Thr	Gly	Ile	340	345	350
Gly	Lys	Leu	Val	Glu	Gln	Ala	Lys	Lys	Trp	Gly	His	Glu	Ala	Ile	Ala	355	360	365
Leu	Thr	Asp	His	Ala	Val	Val	Gln	Ser	Phe	Pro	Asp	Ala	Tyr	Ser	Ala	370	375	380
Ala	Lys	Lys	His	Gly	Ile	Lys	Met	Ile	Tyr	Gly	Met	Glu	Ala	Asn	Leu	385	390	395
Val	Asp	Asp	Gly	Val	Pro	Ile	Ala	Tyr	Asn	Ala	Ala	His	Arg	Leu	Leu	405	410	415
Glu	Glu	Glu	Thr	Tyr	Val	Val	Phe	Asp	Val	Glu	Thr	Thr	Gly	Leu	Ser	420	425	430
Ala	Val	Tyr	Asp	Thr	Ile	Ile	Glu	Leu	Ala	Ala	Val	Lys	Val	Lys	Gly	435	440	445
Gly	Glu	Ile	Ile	Asp	Lys	Phe	Glu	Ala	Phe	Ala	Asn	Pro	His	Arg	Pro	450	455	460
Leu	Ser	Ala	Thr	Ile	Ile	Glu	Leu	Thr	Gly	Ile	Thr	Asp	Asp	Met	Leu	465	470	475
Gln	Asp	Ala	Pro	Asp	Val	Val	Asp	Val	Ile	Arg	Asp	Phe	Arg	Glu	Trp	485	490	495
Ile	Gly	Asp	Asp	Ile	Leu	Val	Ala	His	Asn	Ala	Ser	Phe	Asp	Met	Gly	500	505	510
Phe	Leu	Asn	Val	Ala	Tyr	Lys	Lys	Leu	Leu	Glu	Val	Glu	Lys	Ala	Lys	515	520	525
Asn	Pro	Val	Ile	Asp	Thr	Leu	Glu	Leu	Gly	Arg	Phe	Leu	Tyr	Pro	Glu	530	535	540
Phe	Lys	Asn	His	Arg	Leu	Asn	Thr	Leu	Cys	Lys	Lys	Phe	Asp	Ile	Glu	545	550	555
Leu	Thr	Gln	His	His	Arg	Ala	Ile	Tyr	Asp	Thr	Glu	Ala	Thr	Ala	Tyr	565	570	575
Leu	Leu	Leu	Lys	Met	Leu	Lys	Asp	Ala	Ala	Glu	Lys	Gly	Ile	Gln	Tyr	580	585	590
His	Asp	Glu	Leu	Asn	Glu	Asn	Met	Gly	Gln	Ser	Asn	Ala	Tyr	Gln	Arg	595	600	605
Ser	Arg	Pro	Tyr	His	Ala	Thr	Leu	Leu	Ala	Val	Asn	Ser	Thr	Gly	Leu	610	615	620
Lys	Asn	Leu	Phe	Lys	Leu	Val	Ser	Leu	Ser	His	Ile	His	Tyr	Phe	Tyr	625	630	635
Arg	Val	Pro	Arg	Ile	Pro	Arg	Ser	Gln	Leu	Glu	Lys	Tyr	Arg	Glu	Gly	645	650	655
Leu	Leu	Ile	Gly	Ser	Ala	Cys	Asp	Arg	Gly	Glu	Val	Phe	Glu	Gly	Met	660	665	670
Met	Gln	Lys	Ser	Pro	Glu	Glu	Val	Glu	Asp	Ile	Ala	Ser	Phe	Tyr	Asp	675	680	685
Tyr	Leu	Glu	Val	Gln	Pro	Pro	Glu	Val	Tyr	Arg	His	Leu	Leu	Glu	Leu	690	695	700
Glu	Leu	Val	Arg	Asp	Glu	Lys	Ala	Leu	Lys	Glu	Ile	Ile	Ala	Asn	Ile	705	710	715

Thr	Lys	Leu	Gly	Glu	Lys	Leu	Asn	Lys	Pro	Val	Val	Ala	Thr	Gly	Asn	
				725					730					735		
Val	His	Tyr	Leu	Asn	Asp	Glu	Asp	Lys	Ile	Tyr	Arg	Lys	Ile	Leu	Ile	
			740					745					750			
Ser	Ser	Gln	Gly	Gly	Ala	Asn	Pro	Leu	Asn	Arg	His	Glu	Leu	Pro	Lys	
		755					760					765				
Val	His	Phe	Arg	Thr	Thr	Asp	Glu	Met	Leu	Glu	Ala	Phe	Ser	Phe	Leu	
	770					775					780					
Gly	Glu	Glu	Lys	Ala	Lys	Glu	Ile	Val	Val	Thr	Asn	Thr	Gln	Lys	Val	
785					790				795						800	
Ala	Ser	Leu	Val	Asp	Asp	Ile	Lys	Pro	Ile	Lys	Asp	Asp	Leu	Tyr	Thr	
				805					810					815		
Pro	Lys	Ile	Glu	Gly	Ala	Asp	Glu	Glu	Ile	Arg	Glu	Met	Ser	Tyr	Gln	
			820					825					830			
Arg	Ala	Arg	Ser	Ile	Tyr	Gly	Glu	Glu	Leu	Pro	Glu	Ile	Val	Glu	Ala	
		835					840					845				
Arg	Ile	Glu	Lys	Glu	Leu	Lys	Ser	Ile	Ile	Gly	His	Gly	Phe	Ala	Val	
	850					855					860					
Ile	Tyr	Leu	Ile	Ser	His	Lys	Leu	Val	Lys	Arg	Ser	Leu	Asp	Asp	Gly	
865					870					875					880	
Tyr	Leu	Val	Gly	Ser	Arg	Gly	Ser	Val	Gly	Ser	Ser	Leu	Val	Ala	Thr	
				885					890					895		
Leu	Thr	Glu	Ile	Thr	Glu	Val	Asn	Pro	Leu	Pro	Pro	His	Tyr	Val	Cys	
			900					905					910			
Pro	Glu	Cys	Gln	His	Ser	Glu	Phe	Phe	Asn	Asp	Gly	Ser	Val	Gly	Ser	
		915					920					925				
Gly	Phe	Asp	Leu	Pro	Asp	Lys	Thr	Cys	Pro	His	Cys	Gly	Thr	Pro	Leu	
	930					935					940					
Lys	Lys	Asp	Gly	His	Asp	Ile	Pro	Phe	Glu	Thr	Phe	Leu	Gly	Phe	Lys	
945					950					955					960	
Gly	Asp	Lys	Val	Pro	Asp	Ile	Asp	Leu	Asn	Phe	Ser	Gly	Glu	Tyr	Gln	
				965					970					975		
Pro	Gln	Ala	His	Asn	Tyr	Thr	Lys	Val	Leu	Phe	Gly	Glu	Asp	Asn	Val	
			980					985					990			
Tyr	Arg	Ala	Gly	Thr	Ile	Gly	Thr	Val	Ala	Glu	Lys	Thr	Ala	Tyr	Gly	
		995					1000						1005			
Tyr	Val	Lys	Gly	Tyr	Ala	Gly	Asp	Asn	Asn	Leu	His	Met	Arg	Gly	Ala	
	1010					1015					1020					
Glu	Ile	Asp	Arg	Leu	Val	Gln	Gly	Cys	Thr	Gly	Val	Lys	Arg	Thr	Thr	
1025					1030					1035					1040	
Gly	Gln	His	Pro	Gly	Gly	Ile	Ile	Val	Val	Pro	Asp	Tyr	Met	Asp	Ile	
				1045					1050					1055		
Tyr	Asp	Phe	Ser	Pro	Ile	Gln	Phe	Pro	Ala	Asp	Ala	Thr	Gly	Ser	Glu	
			1060					1065					1070			
Trp	Lys	Thr	Thr	His	Phe	Asp	Phe	His	Ser	Ile	His	Asp	Asn	Leu	Leu	
	1075						1080					1085				
Lys	Leu	Asp	Ile	Leu	Gly	His	Asp	Asp	Pro	Thr	Val	Ile	Arg	Met	Leu	
	1090					1095					1100					
Gln	Asp	Leu	Ser	Gly	Ile	Asp	Pro	Lys	Thr	Ile	Pro	Thr	Asp	Asp	Pro	
1105					1110					1115					1120	
Glu	Val	Met	Lys	Ile	Phe	Gln	Gly	Thr	Glu	Ser	Leu	Gly	Val	Thr	Glu	
				1125					1130					1135		
Glu	Gln	Ile	Gly	Cys	Lys	Thr	Gly	Thr	Leu	Gly	Ile	Pro	Glu	Phe	Gly	
			1140					1145					1150			

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Thr Arg Phe Val Arg Gln Met Leu Glu Asp Thr Lys Pro Thr Thr Phe
      1155                1160                1165
Ser Glu Leu Val Gln Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp
      1170                1175                1180
Leu Gly Asn Ala Gln Glu Leu Ile His Asn Asn Ile Cys Glu Leu Ser
1185                1190                1195                1200
Glu Val Ile Gly Cys Arg Asp Asp Ile Met Val Tyr Leu Ile Tyr Gln
      1205                1210                1215
Gly Leu Glu Pro Ser Leu Ala Phe Lys Ile Met Glu Phe Val Arg Lys
      1220                1225                1230
Gly Lys Gly Leu Thr Pro Glu Trp Glu Glu Glu Met Lys Asn Asn Asn
      1235                1240                1245
Val Pro Asp Trp Tyr Ile Asp Ser Cys Lys Lys Ile Lys Tyr Met Phe
      1250                1255                1260
Pro Lys Ala His Ala Ala Tyr Val Leu Met Ala Val Arg Ile Ala
1265                1270                1275                1280
Tyr Phe Lys Val His His Ala Leu Leu Tyr Tyr Ala Ala Tyr Phe Thr
      1285                1290                1295
Val Arg Ala Asp Asp Phe Asp Ile Asp Thr Met Ile Lys Gly Ser Thr
      1300                1305                1310
Ala Ile Arg Ala Val Met Glu Asp Ile Asn Ala Lys Gly Leu Asp Ala
      1315                1320                1325
Ser Pro Lys Glu Lys Asn Leu Leu Thr Val Leu Glu Leu Ala Leu Glu
      1330                1335                1340
Met Cys Glu Arg Gly Tyr Ser Phe Gln Lys Val Asp Leu Tyr Arg Ser
1345                1350                1355                1360
Ser Ala Thr Glu Phe Ile Ile Asp Gly Asn Ser Leu Ile Pro Pro Phe
      1365                1370                1375
Asn Ser Ile Pro Gly Leu Gly Thr Asn Ala Ala Leu Asn Ile Val Lys
      1380                1385                1390
Ala Arg Glu Glu Gly Glu Phe Leu Ser Lys Glu Asp Leu Gln Lys Arg
      1395                1400                1405
Gly Lys Val Ser Lys Thr Ile Leu Glu Tyr Leu Asp Arg His Gly Cys
      1410                1415                1420
Leu Glu Ser Leu Pro Asp Gln Asn Gln Leu Ser Leu Phe
1425                1430                1435

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<210> 45

<211> 1081

<212> PRT

<213> *Arabidopsis thaliana*

<400> 45

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Met Asn Arg Ser Gly Ile Ser Lys Lys Arg Pro Pro Pro Ser Asn Thr
  1                5                10                15
Pro Pro Pro Ala Gly Lys His Arg Ala Thr Gly Asp Ser Thr Pro Ser
      20                25                30
Pro Ala Ile Gly Thr Leu Asp Asp Glu Phe Met Met Glu Glu Asp Val
      35                40                45
Phe Leu Asp Glu Thr Leu Leu Tyr Gly Asp Glu Asp Glu Glu Ser Leu
      50                55                60
Ile Leu Arg Asp Ile Glu Glu Arg Glu Ser Arg Ser Ser Ala Trp Ala
      65                70                75                80

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Arg	Pro	Pro	Leu	Ser	Pro	Ala	Tyr	Leu	Ser	Asn	Ser	Gln	Ile	Phe	Gln
				85					90					95	
Gln	Leu	Glu	Ile	Asp	Ser	Ile	Ile	Ala	Glu	Ser	His	Lys	Glu	Leu	Leu
			100					105					110		
Pro	Gly	Ser	Ser	Gly	Gln	Ala	Pro	Ile	Ile	Arg	Met	Phe	Gly	Val	Thr
		115					120					125			
Arg	Glu	Gly	Asn	Ser	Val	Cys	Cys	Phe	Val	His	Gly	Phe	Glu	Pro	Tyr
	130					135					140				
Phe	Tyr	Ile	Ala	Cys	Pro	Pro	Gly	Met	Gly	Pro	Asp	Asp	Ile	Ser	Asn
145					150					155					160
Phe	His	Gln	Ser	Leu	Glu	Gly	Arg	Met	Arg	Glu	Ser	Asn	Lys	Asn	Ala
				165					170					175	
Lys	Val	Pro	Lys	Phe	Val	Lys	Arg	Ile	Glu	Met	Val	Gln	Lys	Arg	Ser
		180						185					190		
Ile	Met	Tyr	Tyr	Gln	Gln	Gln	Lys	Ser	Gln	Thr	Phe	Leu	Lys	Ile	Thr
	195						200					205			
Val	Ala	Leu	Pro	Thr	Met	Val	Ala	Ser	Cys	Arg	Gly	Ile	Leu	Asp	Arg
	210					215					220				
Gly	Leu	Gln	Ile	Asp	Gly	Leu	Gly	Met	Lys	Ser	Phe	Gln	Thr	Tyr	Glu
225					230					235					240
Ser	Asn	Ile	Leu	Phe	Val	Leu	Arg	Phe	Met	Val	Asp	Cys	Asp	Ile	Val
				245					250					255	
Gly	Gly	Asn	Trp	Ile	Glu	Val	Pro	Thr	Gly	Lys	Tyr	Lys	Lys	Asn	Ala
			260					265					270		
Arg	Thr	Leu	Ser	Tyr	Cys	Gln	Leu	Glu	Phe	His	Cys	Leu	Tyr	Ser	Asp
	275						280					285			
Leu	Ile	Ser	His	Ala	Ala	Glu	Gly	Glu	Tyr	Ser	Lys	Met	Ala	Pro	Phe
	290					295					300				
Arg	Val	Leu	Ser	Phe	Asp	Ile	Glu	Cys	Ala	Gly	Arg	Lys	Gly	His	Phe
305					310					315					320
Pro	Glu	Ala	Lys	His	Asp	Pro	Val	Ile	Gln	Ile	Ala	Asn	Leu	Val	Thr
				325					330					335	
Leu	Gln	Gly	Glu	Asp	His	Pro	Phe	Val	Arg	Asn	Val	Met	Thr	Leu	Lys
			340					345					350		
Ser	Cys	Ala	Pro	Ile	Val	Gly	Val	Asp	Val	Met	Ser	Phe	Glu	Thr	Glu
		355					360					365			
Arg	Glu	Val	Leu	Leu	Ala	Trp	Arg	Asp	Leu	Ile	Arg	Asp	Val	Asp	Pro
	370					375					380				
Asp	Ile	Ile	Ile	Gly	Tyr	Asn	Ile	Cys	Lys	Phe	Asp	Leu	Pro	Tyr	Leu
385					390					395					400
Ile	Glu	Arg	Ala	Ala	Thr	Leu	Gly	Ile	Glu	Glu	Phe	Pro	Leu	Leu	Gly
				405					410					415	
Arg	Val	Lys	Asn	Ser	Arg	Val	Arg	Val	Arg	Asp	Ser	Thr	Phe	Ser	Ser
			420					425					430		
Arg	Gln	Gln	Gly	Ile	Arg	Glu	Ser	Lys	Glu	Thr	Thr	Ile	Glu	Gly	Arg
		435					440					445			
Phe	Gln	Phe	Asp	Leu	Ile	Gln	Ala	Ile	His	Arg	Asp	His	Lys	Leu	Ser
	450					455					460				
Ser	Tyr	Ser	Leu	Asn	Ser	Val	Ser	Ala	His	Phe	Leu	Ser	Glu	Gln	Lys
465					470					475					480
Glu	Asp	Val	His	His	Ser	Ile	Ile	Thr	Asp	Leu	Gln	Asn	Gly	Asn	Ala
				485					490					495	
Glu	Thr	Arg	Arg	Arg	Leu	Ala	Val	Tyr	Cys	Leu	Lys	Asp	Ala	Tyr	Leu
			500					505					510		

Pro	Gln	Arg	Leu	Leu	Asp	Lys	Leu	Met	Phe	Ile	Tyr	Asn	Tyr	Val	Glu
		515					520					525			
Met	Ala	Arg	Val	Thr	Gly	Val	Pro	Ile	Ser	Phe	Leu	Leu	Ala	Arg	Gly
		530				535					540				
Gln	Ser	Ile	Lys	Val	Leu	Ser	Gln	Leu	Leu	Arg	Lys	Gly	Lys	Gln	Lys
545					550					555					560
Asn	Leu	Val	Leu	Pro	Asn	Ala	Lys	Gln	Ser	Gly	Ser	Glu	Gln	Gly	Thr
				565					570					575	
Tyr	Glu	Gly	Ala	Thr	Val	Leu	Glu	Ala	Arg	Thr	Gly	Phe	Tyr	Glu	Lys
			580					585					590		
Pro	Ile	Ala	Thr	Leu	Asp	Phe	Ala	Ser	Leu	Tyr	Pro	Ser	Ile	Met	Met
		595					600					605			
Ala	Tyr	Asn	Leu	Cys	Tyr	Cys	Thr	Leu	Val	Thr	Pro	Glu	Asp	Val	Arg
		610				615					620				
Lys	Leu	Asn	Leu	Pro	Pro	Glu	His	Val	Thr	Lys	Thr	Pro	Ser	Gly	Glu
625					630					635					640
Thr	Phe	Val	Lys	Gln	Thr	Leu	Gln	Lys	Gly	Ile	Leu	Pro	Glu	Ile	Leu
				645					650					655	
Glu	Glu	Leu	Leu	Thr	Ala	Arg	Lys	Arg	Ala	Lys	Ala	Asp	Leu	Lys	Glu
			660					665					670		
Ala	Lys	Asp	Pro	Leu	Glu	Lys	Ala	Val	Leu	Asp	Gly	Arg	Gln	Leu	Ala
		675					680					685			
Leu	Lys	Ile	Ser	Ala	Asn	Ser	Val	Tyr	Gly	Phe	Thr	Gly	Ala	Thr	Val
		690				695					700				
Gly	Gln	Leu	Pro	Cys	Leu	Glu	Ile	Ser	Ser	Ser	Val	Thr	Ser	Tyr	Gly
705					710					715					720
Arg	Gln	Met	Ile	Glu	Gln	Thr	Lys	Lys	Leu	Val	Glu	Asp	Lys	Phe	Thr
				725						730				735	
Thr	Leu	Gly	Gly	Tyr	Gln	Tyr	Asn	Ala	Glu	Val	Ile	Tyr	Gly	Asp	Thr
			740					745					750		
Asp	Ser	Val	Met	Val	Gln	Phe	Gly	Val	Ser	Asp	Val	Glu	Ala	Ala	Met
		755					760					765			
Thr	Leu	Gly	Arg	Glu	Ala	Ala	Glu	His	Ile	Ser	Gly	Thr	Phe	Ile	Lys
		770				775					780				
Pro	Ile	Lys	Leu	Glu	Phe	Glu	Lys	Val	Tyr	Phe	Pro	Tyr	Leu	Leu	Ile
785					790					795					800
Asn	Lys	Lys	Arg	Tyr	Ala	Gly	Leu	Leu	Trp	Thr	Asn	Pro	Gln	Gln	Phe
				805					810					815	
Asp	Lys	Met	Asp	Thr	Lys	Gly	Ile	Glu	Thr	Val	Arg	Arg	Asp	Asn	Cys
			820					825					830		
Leu	Leu	Val	Lys	Asn	Leu	Val	Thr	Glu	Ser	Leu	Asn	Lys	Ile	Leu	Ile
		835					840					845			
Asp	Arg	Asp	Val	Pro	Gly	Ala	Ala	Glu	Asn	Val	Lys	Lys	Thr	Ile	Ser
		850				855					860				
Asp	Leu	Leu													


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Ile Pro Ile Asp Pro Asn Tyr Tyr Leu Glu Asn Gln Ile Ser Lys Pro
945          950          955          960
Leu Leu Arg Ile Phe Glu Pro Val Leu Lys Asn Ala Ser Lys Glu Leu
          965          970          975
Leu His Gly Ser His Thr Arg Ser Ile Ser Ile Thr Thr Pro Ser Asn
          980          985          990
Ser Gly Ile Met Lys Phe Ala Lys Lys Gln Leu Ser Cys Val Gly Cys
          995          1000          1005
Lys Val Pro Ile Arg Tyr Phe Val Gln Trp Asn Thr Met Arg Lys Leu
          1010          1015          1020
Gln Gly Lys Arg Ser Arg Val Ile Leu Gln Lys Arg Val Ser Arg Tyr
1025          1030          1035          1040
Ala Ala Trp Leu Ser Leu Lys Arg Phe Leu Gly Gly Cys Gly His Ser
          1045          1050          1055
Ala Arg Ser Val Lys Ala Leu Phe Ile Lys Met Ser Cys Ala Pro Val
          1060          1065          1070
Glu Ile Val Gln Tyr Phe Thr Gly Glu
          1075          1080

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<210> 46
<211> 2154
<212> PRT
<213> Arabidopsis thaliana

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          20          25          30
Gly Glu Thr Arg Leu Gly Trp Leu Leu Thr Phe Ala Ser Ser Ser Trp
          35          40          45
Glu Asp Ala Asp Thr Gly Lys Thr Phe Ser Cys Val Asp Leu Phe Phe
          50          55          60
Val Thr Gln Asp Gly Ser Ser Phe Lys Thr Lys Tyr Lys Phe Arg Pro
          65          70          75          80
Tyr Leu Tyr Ala Ala Thr Lys Asp Asn Met Glu Leu Glu Val Glu Ala
          85          90          95
Tyr Leu Arg Arg Arg Tyr Glu Arg Gln Val Ala Asp Ile Gln Ile Val
          100          105          110
His Lys Glu Asp Leu Tyr Leu Lys Asn His Leu Ser Gly Leu Gln Lys
          115          120          125
Lys Tyr Leu Lys Val Ser Phe Asp Thr Val Gln Gln Leu Val Glu Val
          130          135          140
Lys Arg Asp Leu Leu His Ile Val Glu Arg Asn Leu Ala Lys Phe Asn
          145          150          155          160
Ala Leu Glu Ala Tyr Glu Ser Ile Leu Ser Gly Lys Arg Glu Gln Arg
          165          170          175
Pro Gln Asp Cys Leu Asp Ser Val Val Asp Leu Arg Glu Tyr Asp Val
          180          185          190
Pro Tyr His Val Arg Phe Ala Ile Asp Asn Asp Val Arg Ser Gly Gln
          195          200          205
Trp Tyr Asn Val Ser Ile Ser Ser Thr Asp Val Ile Leu Glu Lys Arg
          210          215          220

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Thr	Asp	Leu	Leu	Gln	Arg	Ala	Glu	Val	Arg	Val	Cys	Ala	Phe	Asp	Ile
225					230					235					240
Glu	Thr	Val	Lys	Leu	Pro	Leu	Lys	Phe	Pro	Asp	Ala	Glu	Tyr	Asp	Gln
				245					250					255	
Ile	Met	Met	Ile	Ser	Tyr	Met	Val	Asp	Gly	Gln	Gly	Phe	Leu	Ile	Thr
			260					265					270		
Asn	Arg	Glu	Cys	Val	Gly	Lys	Asp	Ile	Glu	Asp	Leu	Glu	Tyr	Thr	Pro
		275					280				285				
Lys	Pro	Glu	Phe	Glu	Gly	Tyr	Phe	Lys	Val	Thr	Asn	Val	Thr	Asn	Glu
	290					295					300				
Val	Glu	Leu	Leu	Arg	Lys	Trp	Phe	Ser	His	Met	Gln	Glu	Leu	Lys	Pro
305					310					315					320
Gly	Ile	Tyr	Val	Thr	Tyr	Asn	Gly	Asp	Phe	Phe	Asp	Trp	Pro	Phe	Ile
				325					330					335	
Glu	Arg	Arg	Ala	Ser	His	His	Gly	Ile	Lys	Met	Asn	Glu	Glu	Leu	Gly
			340					345					350		
Phe	Arg	Cys	Asp	Gln	Asn	Gln	Gly	Glu	Cys	Arg	Ala	Lys	Phe	Val	Cys
		355					360					365			
His	Leu	Asp	Cys	Phe	Ser	Trp	Val	Lys	Arg	Asp	Ser	Tyr	Leu	Pro	Gln
	370					375					380				
Gly	Ser	Gln	Gly	Leu	Lys	Ala	Val	Thr	Lys	Val	Lys	Leu	Gly	Tyr	Asp
385					390					395					400
Pro	Leu	Glu	Val	Asn	Pro	Glu	Asp	Met	Val	Arg	Phe	Ala	Met	Glu	Lys
				405					410					415	
Pro	Gln	Thr	Met	Ala	Ser	Tyr	Ser	Val	Ser	Asp	Ala	Val	Ala	Thr	Tyr
			420					425					430		
Tyr	Leu	Tyr	Met	Thr	Tyr	Val	His	Pro	Phe	Val	Phe	Ser	Leu	Ala	Thr
		435					440					445			
Ile	Ile	Pro	Met	Val	Pro	Asp	Glu	Val	Leu	Arg	Lys	Gly	Ser	Gly	Thr
	450					455					460				
Leu	Cys	Glu	Met	Leu	Leu	Met	Val	Glu	Ala	Tyr	Lys	Ala	Asn	Val	Val
465					470					475					480
Cys	Pro	Asn	Lys	Asn	Gln	Ala	Asp	Pro	Glu	Lys	Phe	Tyr	Gln	Gly	Lys
				485					490					495	
Leu	Leu	Glu	Ser	Glu	Thr	Tyr	Ile	Gly	Gly	His	Val	Glu	Cys	Leu	Gln
			500					505					510		
Ser	Gly	Val	Phe	Arg	Ser	Asp	Ile	Pro	Thr	Ser	Phe	Lys	Leu	Asp	Ala
		515					520					525			
Ser	Ala	Tyr	Gln	Gln	Leu	Ile	Asp	Asn	Leu	Gly	Arg	Asp	Leu	Glu	Tyr
	530					535					540				
Ala	Ile	Thr	Val	Glu	Gly	Lys	Met	Arg	Met	Asp	Ser	Val	Ser	Asn	Phe
545					550					555					560
Asp	Glu	Val	Lys	Glu	Val	Ile	Arg	Glu	Lys	Leu	Glu	Lys	Leu	Arg	Asp
				565					570					575	
Asp	Pro	Ile	Arg	Glu	Glu	Gly	Pro	Leu	Ile	Tyr	His	Leu	Asp	Val	Ala
			580					585					590		
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 Tyr Gln Gly Trp Leu Glu Leu Glu Lys Arg Lys Trp Lys Met Thr Leu
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 Thr Asn Lys Lys Lys Arg Arg Phe Asp Asp Leu Lys Pro Cys Asn Gln
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 1905 1910 1915 1920
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Glu	Asp	Leu	Val	Lys	Val	Arg	Lys	Glu	Ile	Ser	Pro	Ala	Val	Lys	Lys
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Ser	Ile	Leu	Gln	Gly	Gly	Ser	Val	Ile	Thr	Asp	Glu	Glu	Glu	Thr	Ser
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Asp	Val	Pro	Tyr	His	Ile	Arg	Leu	Ser	Ile	Asp	Leu	Arg	Ile	His	Val
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Ala	His	Trp	Tyr	Asn	Val	Arg	Phe	Arg	Gly	Asn	Ala	Phe	Pro	Val	Glu
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Glu	Thr	Asp	Gln	Ile	Met	Met	Ile	Ser	Tyr	Met	Ile	Asp	Gly	Gln	Gly			
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Tyr	Leu	Ile	Thr	Asn	Arg	Glu	Ile	Val	Ser	Glu	Asp	Ile	Glu	Asp	Phe			
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 755 760 765
 Lys Gly Leu His Lys Val Trp Lys Lys Lys Leu Ser Ala Ala Val Glu
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 Val Gly Asp Ala Ser Glu Val Lys Arg Cys Lys Asn Met Glu Ile Leu
 785 790 795 800
 Tyr Asp Ser Leu Gln Leu Ala His Lys Cys Ile Leu Asn Ser Phe Tyr
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 Gly Tyr Val Met Arg Lys Gly Ala Arg Trp Tyr Ser Met Glu Met Ala
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Trp	Cys	Val	Leu	Pro	Asn	Ser	Phe	Pro	Glu	Asn	Phe	Val	Ile	Lys	Thr
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Leu Gly Ser Ala Ile Gln Lys Ile Ile Thr Ile Pro Ala Ala Leu Gln	1140	1145	1150
Gln Val Lys Asn Pro Val Pro Arg Val Lys His Pro Asp Trp Leu His	1155	1160	1165
Lys Lys Leu Leu Glu Lys Asn Asp Ile Tyr Lys Gln Lys Lys Ile Ser	1170	1175	1180
Glu Leu Phe Val Leu Glu Gly Lys Arg Gln Ile Val Met Ala Gln Ala	1185	1190	1195
Ser Glu Asn Ser Leu Ser Leu Cys Thr Pro Asp Met Glu Asp Ile Gly	1205	1210	1215
Leu Thr Lys Pro His His Ser Thr Val Pro Val Ala Thr Lys Arg Lys	1220	1225	1230
Arg Val Trp Glu Thr Gln Lys Glu Ser Gln Asp Ile Ala Leu Thr Val	1235	1240	1245
Pro Trp Gln Glu Val Leu Gly Gln Pro Pro Ser Leu Gly Thr Thr Gln	1250	1255	1260
Glu Glu Trp Leu Val Trp Leu Gln Phe His Lys Lys Lys Trp Gln Leu	1265	1270	1275
Gln Ala Gln Gln Arg Leu Ala Leu Arg Lys Lys Gln Arg Leu Glu Ser	1285	1290	1295
Ala Glu Asp Met Pro Arg Leu Gly Pro Ile Arg Glu Glu Pro Ser Thr	1300	1305	1310
Gly Leu Gly Ser Phe Leu Arg Arg Thr Ala Arg Ser Ile Met Asp Leu	1315	1320	1325
Pro Trp Gln Ile Ile Gln Ile Ser Glu Thr Arg Gln Ala Gly Leu Phe	1330	1335	1340
Arg Leu Trp Ala Ile Ile Gly Asn Asp Leu His Cys Ile Lys Leu Ser	1345	1350	1355
Ile Pro Arg Val Phe Tyr Val Asn Gln Arg Val Ala Lys Ala Glu Asp	1365	1370	1375
Gly Pro Ala Tyr Arg Lys Val Asn Arg Gly Leu Phe Leu Arg Ser Asn	1380	1385	1390
Ile Val Tyr Asn Leu Tyr Glu Tyr Ser Val Pro Glu Asp Met Tyr Gln	1395	1400	1405

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 Gly Trp Glu Ala Glu Thr Phe Ala Leu Glu His Leu Glu Met Arg Ser
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 Leu Ala Gln Phe Ser Tyr Leu Glu Pro Gly Ser Ile Arg His Ile Tyr
 1475 1480 1485
 Leu Tyr His His Thr Gln Gly His Lys Ala Leu Phe Gly Val Phe Ile
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 Asn His Leu Leu Trp Leu Ser Pro Thr Ser Arg Pro Asp Leu Gly Gly
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 1825 1830 1835 1840
 Leu His Asn Met Met Lys Lys Leu Phe Leu Gln Leu Ile Ala Glu Phe
 1845 1850 1855
 Lys Arg Leu Gly Ser Ser Val Val Tyr Ala Asn Phe Asn Arg Ile Ile
 1860 1865 1870
 Leu Cys Thr Lys Lys Arg Arg Ile Glu Asp Ala Leu Ala Tyr Val Glu
 1875 1880 1885
 Tyr Ile Thr Asn Ser Ile His Ser Lys Glu Ile Phe His Ser Leu Thr
 1890 1895 1900
 Ile Ser Phe Ser Arg Cys Trp Glu Phe Leu Leu Trp Met Asp Pro Ser
 1905 1910 1915 1920
 Asn Tyr Gly Gly Ile Lys Gly Lys Val Pro Ser Ser Ile His Cys Gly
 1925 1930 1935
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 1940 1945 1950
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 1955 1960 1965
 Glu Val Glu Asp Leu Leu Glu Asn Asn Trp Asn Ile Leu Gln Phe Leu
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 1985 1990 1995 2000
 Tyr Ile Val Ala Val Tyr Gln Ser Met Lys Glu Glu Leu Arg His Ser
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 Ala Pro Gly Ser Thr Pro Val Lys Arg Lys Gly Ala Ser Gln Phe Ser
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 Glu Ala Glu Glu Glu Leu Gln Leu Pro Pro Glu Gly Ile Val Gly Gly
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 Gln Phe Ser Thr Ala Asp Ile Asp Pro Arg Trp Leu Arg Pro Thr Pro
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 Ile Asp His Tyr Val Gly Thr Ser Pro Pro Leu Pro Glu Gly Pro Pro
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 Ala Ser Arg Asn Ser Val Pro Ile Leu Arg Ala Phe Gly Val Thr Asp
 115 120 125
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 130 135 140
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Ser	Met	Phe	Gly	Tyr	His	Gly	His	Gly	Pro	Ser	Pro	Phe	Leu	Arg	Ile	195	200	205	
Thr	Leu	Ala	Leu	Pro	Arg	Leu	Met	Ala	Pro	Ala	Arg	Arg	Leu	Leu	Glu	210	215	220	
Gln	Gly	Ile	Arg	Val	Pro	Gly	Leu	Gly	Thr	Pro	Ser	Phe	Ala	Pro	Tyr	225	230	235	240
Glu	Ala	Asn	Val	Asp	Phe	Glu	Ile	Arg	Phe	Met	Val	Asp	Ala	Asp	Ile	245	250	255	
Val	Gly	Cys	Asn	Trp	Leu	Glu	Leu	Pro	Ala	Gly	Lys	Tyr	Val	Arg	Arg	260	265	270	
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Ser	Asp	Val	Ile	Ser	His	Pro	Pro	Glu	Gly	Gln	Trp	Gln	Arg	Ile	Ala	290	295	300	
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Ile	Phe	Pro	Glu	Pro	Glu	Arg	Asp	Pro	Val	Ile	Gln	Ile	Cys	Ser	Leu	325	330	335	
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Gln	Ser	Arg	Gln	Val	Gly	Arg	Arg	Asp	Ser	Lys	Val	Val	Ser	Met	Val	435	440	445	
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Gln	Lys	Glu	Asp	Val	Gln	His	Ser	Ile	Ile	Thr	Asp	Leu	Gln	Asn	Gly	485	490	495	
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Tyr Arg Gln Ser Arg Glu Asn Asp Lys Ile Asp Ser Lys Tyr Gly Phe
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Asp Arg Val Lys Asp Ser Gln Glu Arg Thr Gly Tyr Leu Ile Asn Met
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His Ser Asn Glu Val Leu Asp Glu Asp Arg Arg Leu Ile Ala Ala Leu
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Glu	Val	Ala	Arg	Phe	Leu	Gly	Arg	Lys	Tyr	Ser	Gly	Gln	Ile	Ser	Gly	115	120	125	
Leu	Glu	His	Ile	Thr	Lys	Glu	Asp	Leu	Asp	Leu	Pro	Asn	His	Leu	Ser	130	135	140	
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Met	Thr	Lys	Val	Arg	Arg	Glu	Leu	Met	Ser	Ala	Val	Lys	Arg	Asn	Gln	165	170	175	
Glu	Arg	Gln	Lys	Ser	Asn	Thr	Tyr	Tyr	Met	Gln	Met	Leu	Ala	Thr	Ser	180	185	190	
Leu	Ala	Gln	Ser	Ser	Ala	Gly	Ser	Glu	Asp	Ala	Thr	Leu	Gly	Lys	Arg	195	200	205	
Gln	Gln	Asp	Tyr	Met	Asp	Cys	Ile	Val	Asp	Ile	Arg	Glu	His	Asp	Val	210	215	220	
Pro	Tyr	His	Val	Arg	Val	Ser	Ile	Asp	Leu	Arg	Ile	Phe	Cys	Gly	Gln	225	230	235	240
Trp	Tyr	Asn	Ile	Arg	Cys	Arg	Ser	Gly	Val	Glu	Leu	Pro	Thr	Ile	Thr	245	250	255	
Cys	Arg	Pro	Asp	Ile	Leu	Asp	Arg	Pro	Glu	Pro	Val	Val	Leu	Ala	Phe	260	265	270	
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Thr	Pro	Lys	Pro	Glu	Phe	Glu	Gly	Asn	Phe	Ile	Val	Phe	Asn	Glu	Glu	325	330	335	
Asn	Glu	Met	Gln	Leu	Leu	Gln	Arg	Phe	Phe	Asp	His	Ile	Met	Glu	Val	340	345	350	
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 Ser Ala Met Val Ser Asp Leu Asp Cys Ala Ala Cys Asp Phe Asn Lys
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Glu	Thr	Glu	Lys	Phe	Pro	Pro	Leu	Phe	Pro	Gly	Gly	Pro	Gln	Arg	Ala	
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Leu	Thr	Asp	Tyr	Cys	Arg	Lys	Ala	Tyr	Lys	Lys	Thr	Lys	Leu	Thr	Lys	
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Lys	Asp	Lys	Glu	Asn	Asn	Leu	Pro	Lys	Tyr	Asp	Ile	Arg	Asp	Glu	Asn	
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Ser	Ile	Phe	Phe	Glu	Val	Asp	Gly	Pro	Tyr	Leu	Ala	Met	Val	Leu	Pro	
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 Asn Phe Asp Gly Thr Leu Ala Glu Leu Lys Gly Phe Glu Val Lys Arg
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Gly Ala Glu His Leu Ser Glu Leu Gln Gln Glu Leu Asn Ala Ala Ile	155	160	165	170
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Pro Ala Gly Lys Tyr Val Arg Arg Ala Glu Lys Lys Ala Thr Leu Cys	270	275	280	
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Pro	Leu	Lys	Gly	Tyr	Tyr	Asp	Val	Pro	Ile	Ala	Thr	Leu	Asp	Phe	Ser			
590						595						600						
tcc	ttg	tac	cca	tcc	atc	atg	atg	gcc	cat	aat	ctg	tgc	tac	acc	acg	1877		
Ser	Leu	Tyr	Pro	Ser	Ile	Met	Met	Ala	His	Asn	Leu	Cys	Tyr	Thr	Thr			
605						610						615						
ctg	ctc	cga	cct	ggg	gct	gcc	cag	aag	ctg	ggc	ctt	aaa	cca	gat	gag	1925		
Leu	Leu	Arg	Pro	Gly	Ala	Ala	Gln	Lys	Leu	Gly	Leu	Lys	Pro	Asp	Glu			
620						625						630						
ttc	atc	aag	aca	ccc	act	ggg	gat	gag	ttt	gtg	aag	tca	tct	gta	cgg	1973		
Phe	Ile	Lys	Thr	Pro	Thr	Gly	Asp	Glu	Phe	Val	Lys	Ser	Ser	Val	Arg			
635						640						645				650		
aag	ggc	ctc	ctg	ccc	cag	atc	ctg	gag	aat	ctg	ctg	agt	gcc	cgc	aag	2021		
Lys	Gly	Leu	Leu	Pro	Gln	Ile	Leu	Glu	Asn	Leu	Leu	Ser	Ala	Arg	Lys			
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agg	gcc	aag	gct	gag	ctg	gct	cag	gag	acg	gac	ccc	ctg	cgg	cga	cag	2069		
Arg	Ala	Lys	Ala	Glu	Leu	Ala	Gln	Glu	Thr	Asp	Pro	Leu	Arg	Arg	Gln			
670						675						680						
gtc	ttg	gac	ggc	cgg	caa	ctg	gca	cta	aaa	gtg	agt	gcc	aac	tcc	gta	2117		
Val	Leu	Asp	Gly	Arg	Gln	Leu	Ala	Leu	Lys	Val	Ser	Ala	Asn	Ser	Val			
685						690						695						
tat	ggc	ttc	act	ggt	gcc	cag	gtg	ggc	aag	ctg	cca	tgt	ttg	gag	atc	2165		
Tyr	Gly	Phe	Thr	Gly	Ala	Gln	Val	Gly	Lys	Leu	Pro	Cys	Leu	Glu	Ile			
700						705						710						
tcc	cag	agt	gtc	act	ggg	ttc	ggg	cgg	cag	atg	att	gag	aaa	acc	aag	2213		
Ser	Gln	Ser	Val	Thr	Gly	Phe	Gly	Arg	Gln	Met	Ile	Glu	Lys	Thr	Lys			
715						720						725				730		

cag ctt gtg gag tcc aag tac acc gtg gaa aat ggc tac gat gcc aac	2261
Gln Leu Val Glu Ser Lys Tyr Thr Val Glu Asn Gly Tyr Asp Ala Asn	
735 740 745	
gcc aag gta gtc tac ggt gac acg gac tct gtg atg tgc cgg ttt ggc	2309
Ala Lys Val Val Tyr Gly Asp Thr Asp Ser Val Met Cys Arg Phe Gly	
750 755 760	
gtc tcc tct gtg gct gaa gca atg tct ctg ggg cgg gag gct gca aac	2357
Val Ser Ser Val Ala Glu Ala Met Ser Leu Gly Arg Glu Ala Ala Asn	
765 770 775	
tgg gta tcc agt cac ttc cca tca ccc atc cgg ctg gag ttc gag aag	2405
Trp Val Ser Ser His Phe Pro Ser Pro Ile Arg Leu Glu Phe Glu Lys	
780 785 790	
gtt tac ttc cca tac ctg ctc atc agc aag aag cgc tat gct ggc ctg	2453
Val Tyr Phe Pro Tyr Leu Leu Ile Ser Lys Lys Arg Tyr Ala Gly Leu	
795 800 805 810	
ctc ttc tcc tcc cgc tct gat gcc cat gac aaa atg gac tgc aag ggc	2501
Leu Phe Ser Ser Arg Ser Asp Ala His Asp Lys Met Asp Cys Lys Gly	
815 820 825	
ctg gag gct gtg cgc agg gac aac tgt ccc ctg gtg gcc aac ctc gtt	2549
Leu Glu Ala Val Arg Arg Asp Asn Cys Pro Leu Val Ala Asn Leu Val	
830 835 840	
aca tcc tct ctg cgc cgg atc ctc gtg gac cgg gac cct gat ggg gca	2597
Thr Ser Ser Leu Arg Arg Ile Leu Val Asp Arg Asp Pro Asp Gly Ala	
845 850 855	
gta gcc cat gcc aag gac gtc atc tcg gac ctg ctg tgc aac cgc ata	2645
Val Ala His Ala Lys Asp Val Ile Ser Asp Leu Leu Cys Asn Arg Ile	
860 865 870	
gac atc tcc cag ctg gtc atc acc aaa gag ttg acc cgc gca gca gca	2693
Asp Ile Ser Gln Leu Val Ile Thr Lys Glu Leu Thr Arg Ala Ala Ala	
875 880 885 890	
gac tat gct ggc aag cag gct cac gtg gag ctg gct gag agg atg agg	2741
Asp Tyr Ala Gly Lys Gln Ala His Val Glu Leu Ala Glu Arg Met Arg	
895 900 905	
aag cgc gac ccc ggc agt gcg ccc agc ctg ggt gac cga gtc ccc tat	2789
Lys Arg Asp Pro Gly Ser Ala Pro Ser Leu Gly Asp Arg Val Pro Tyr	
910 915 920	
gtg atc att ggt gct gct aag ggt gtg gcc gcc tac atg aag tcg gag	2837
Val Ile Ile Gly Ala Ala Lys Gly Val Ala Ala Tyr Met Lys Ser Glu	
925 930 935	
gac ccc ctg ttt gtg ctg gag cac agc ctg ccc atc gac act cag tac	2885
Asp Pro Leu Phe Val Leu Glu His Ser Leu Pro Ile Asp Thr Gln Tyr	

940	945	950	
tac ctg gag cag cag ctg gcc aag ccg ctc ttg cgc atc ttt gag ccc			2933
Tyr Leu Glu Gln Gln Leu Ala Lys Pro Leu Leu Arg Ile Phe Glu Pro			
955	960	965	970
atc ctg ggt gag ggc cgt gca gag tct gtg ctg ctg cgc ggt gac cac			2981
Ile Leu Gly Glu Gly Arg Ala Glu Ser Val Leu Leu Arg Gly Asp His			
	975	980	985
aca cga tgc aag act gtg ctc acc agc aag gtg ggc ggc ctc ttg gcc			3029
Thr Arg Cys Lys Thr Val Leu Thr Ser Lys Val Gly Gly Leu Leu Ala			
	990	995	1000
ttc acc aag cgc cgc aac tgt tgc att ggc tgc cgc tcc gta atc			3074
Phe Thr Lys Arg Arg Asn Cys Cys Ile Gly Cys Arg Ser Val Ile			
	1005	1010	1015
gac cat caa gga gcc gtg tgt aag ttc tgt cag cca cgg gag tcg			3119
Asp His Gln Gly Ala Val Cys Lys Phe Cys Gln Pro Arg Glu Ser			
	1020	1025	1030
gag ctc tat cag aag gag gtg tca cac ctg aat gcc ttg gaa gaa			3164
Glu Leu Tyr Gln Lys Glu Val Ser His Leu Asn Ala Leu Glu Glu			
	1035	1040	1045
cgg ttc tct cgc ctc tgg aca cag tgt caa cgc tgc cag ggc agc			3209
Arg Phe Ser Arg Leu Trp Thr Gln Cys Gln Arg Cys Gln Gly Ser			
	1050	1055	1060
ttg cat gag gac gtc atc tgt acc agc cgt gac tgt ccc atc ttc			3254
Leu His Glu Asp Val Ile Cys Thr Ser Arg Asp Cys Pro Ile Phe			
	1065	1070	1075
tac atg cgc aag aag gtg cgc aag gac ctg gaa gac cag gaa cgg			3299
Tyr Met Arg Lys Lys Val Arg Lys Asp Leu Glu Asp Gln Glu Arg			
	1080	1085	1090
ctg ctg cag cgc ttt gga ccg ccc ggc cct gag gcc tgg tga			3341
Leu Leu Gln Arg Phe Gly Pro Pro Gly Pro Glu Ala Trp			
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<210> 87

<211> 1105

<212> PRT

<213> Mus musculus

<400> 87

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			20					25					30		
Phe	Glu	Ala	Asn	Leu	Ala	Leu	Leu	Glu	Glu	Ile	Glu	Ala	Glu	Asn	Arg
		35					40					45			
Leu	Gln	Glu	Ala	Glu	Glu	Glu	Leu	Gln	Leu	Pro	Pro	Glu	Gly	Thr	Val
	50					55					60				
Gly	Gly	Gln	Phe	Ser	Thr	Ala	Asp	Ile	Asp	Pro	Arg	Trp	Arg	Arg	Pro
65					70					75					80
Thr	Leu	Arg	Ala	Leu	Asp	Pro	Ser	Thr	Glu	Pro	Leu	Ile	Phe	Gln	Gln
				85					90					95	
Leu	Glu	Ile	Asp	His	Tyr	Val	Gly	Ser	Ala	Pro	Pro	Leu	Pro	Glu	Gly
			100					105					110		
Pro	Leu	Pro	Ser	Arg	Asn	Ser	Val	Pro	Ile	Leu	Arg	Ala	Phe	Gly	Val
		115					120					125			
Thr	Asp	Glu	Gly	Phe	Ser	Val	Cys	Cys	His	Ile	Gln	Gly	Phe	Ala	Pro
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Tyr	Phe	Tyr	Thr	Pro	Ala	Pro	Pro	Gly	Phe	Gly	Ala	Glu	His	Leu	Ser
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Glu	Leu	Gln	Gln	Glu	Leu	Asn	Ala	Ala	Ile	Ser	Arg	Asp	Gln	Arg	Gly
				165					170					175	
Gly	Lys	Glu	Leu	Ser	Gly	Pro	Ala	Val	Leu	Ala	Ile	Glu	Leu	Cys	Ser
			180					185					190		
Arg	Glu	Ser	Met	Phe	Gly	Tyr	His	Gly	His	Gly	Pro	Ser	Pro	Phe	Leu
		195					200					205			
Arg	Ile	Thr	Leu	Ala	Leu	Pro	Arg	Leu	Met	Ala	Pro	Ala	Arg	Arg	Leu
	210					215					220				
Leu	Glu	Gln	Gly	Val	Arg	Val	Pro	Gly	Leu	Gly	Thr	Pro	Ser	Phe	Ala
225					230					235					240
Pro	Tyr	Glu	Ala	Asn	Val	Asp	Phe	Glu	Ile	Arg	Phe	Met	Val	Asp	Ala
				245					250					255	
Asp	Ile	Val	Gly	Cys	Asn	Trp	Leu	Glu	Leu	Pro	Ala	Gly	Lys	Tyr	Val
		260						265					270		
Arg	Arg	Ala	Glu	Lys	Lys	Ala	Thr	Leu	Cys	Gln	Leu	Glu	Val	Asp	Val
		275					280					285			
Leu	Trp	Ser	Asp	Val	Ile	Ser	His	Pro	Pro	Glu	Gly	Gln	Trp	Gln	Arg
	290					295					300				

Ile Ala Pro Leu Arg Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg
 305 310 315 320
 Lys Gly Ile Phe Pro Glu Pro Glu Arg Asp Pro Val Ile Gln Ile Cys
 325 330 335
 Ser Leu Gly Leu Arg Trp Gly Glu Pro Glu Pro Phe Leu Arg Leu Ala
 340 345 350
 Leu Thr Leu Arg Pro Cys Ala Pro Ile Leu Gly Ala Lys Val Gln Ser
 355 360 365
 Tyr Glu Arg Glu Glu Asp Leu Leu Gln Ala Trp Ala Asp Phe Ile Leu
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 Ala Met Asp Pro Asp Val Ile Thr Gly Tyr Asn Ile Gln Asn Phe Asp
 385 390 395 400
 Leu Pro Tyr Leu Ile Ser Arg Ala Gln Ala Leu Lys Val Asp Arg Phe
 405 410 415
 Pro Phe Leu Gly Arg Val Thr Gly Leu Arg Ser Asn Ile Arg Asp Ser
 420 425 430
 Ser Phe Gln Ser Arg Gln Val Gly Arg Arg Asp Ser Lys Val Ile Ser
 435 440 445
 Met Val Gly Arg Val Gln Met Asp Met Leu Gln Val Leu Leu Arg Glu
 450 455 460
 His Lys Leu Arg Ser Tyr Thr Leu Asn Ala Val Ser Phe His Phe Leu
 465 470 475 480
 Gly Glu Gln Lys Glu Asp Val Gln His Ser Ile Ile Thr Asp Leu Gln
 485 490 495
 Asn Gly Asn Glu Gln Thr Arg Arg Arg Leu Ala Val Tyr Cys Leu Lys
 500 505 510
 Asp Ala Phe Leu Pro Leu Arg Leu Leu Glu Arg Leu Met Val Leu Val
 515 520 525
 Asn Asn Val Glu Met Ala Arg Val Thr Gly Val Pro Leu Gly Tyr Leu
 530 535 540
 Leu Thr Arg Gly Gln Gln Val Lys Val Val Ser Gln Leu Leu Arg Gln
 545 550 555 560
 Ala Met Arg Gln Gly Leu Leu Met Pro Val Val Lys Thr Glu Gly Ser
 565 570 575
 Glu Asp Tyr Thr Gly Ala Thr Val Ile Glu Pro Leu Lys Gly Tyr Tyr
 580 585 590

Asp	Val	Pro	Ile	Ala	Thr	Leu	Asp	Phe	Ser	Ser	Leu	Tyr	Pro	Ser	Ile	595	600	605
Met	Met	Ala	His	Asn	Leu	Cys	Tyr	Thr	Thr	Leu	Leu	Arg	Pro	Gly	Ala	610	615	620
Ala	Gln	Lys	Leu	Gly	Leu	Lys	Pro	Asp	Glu	Phe	Ile	Lys	Thr	Pro	Thr	625	630	635
Gly	Asp	Glu	Phe	Val	Lys	Ser	Ser	Val	Arg	Lys	Gly	Leu	Leu	Pro	Gln	645	650	655
Ile	Leu	Glu	Asn	Leu	Leu	Ser	Ala	Arg	Lys	Arg	Ala	Lys	Ala	Glu	Leu	660	665	670
Ala	Gln	Glu	Thr	Asp	Pro	Leu	Arg	Arg	Gln	Val	Leu	Asp	Gly	Arg	Gln	675	680	685
Leu	Ala	Leu	Lys	Val	Ser	Ala	Asn	Ser	Val	Tyr	Gly	Phe	Thr	Gly	Ala	690	695	700
Gln	Val	Gly	Lys	Leu	Pro	Cys	Leu	Glu	Ile	Ser	Gln	Ser	Val	Thr	Gly	705	710	715
Phe	Gly	Arg	Gln	Met	Ile	Glu	Lys	Thr	Lys	Gln	Leu	Val	Glu	Ser	Lys	725	730	735
Tyr	Thr	Val	Glu	Asn	Gly	Tyr	Asp	Ala	Asn	Ala	Lys	Val	Val	Tyr	Gly	740	745	750
Asp	Thr	Asp	Ser	Val	Met	Cys	Arg	Phe	Gly	Val	Ser	Ser	Val	Ala	Glu	755	760	765
Ala	Met	Ser	Leu	Gly	Arg	Glu	Ala	Ala	Asn	Trp	Val	Ser	Ser	His	Phe	770	775	780
Pro	Ser	Pro	Ile	Arg	Leu	Glu	Phe	Glu	Lys	Val	Tyr	Phe	Pro	Tyr	Leu	785	790	795
Leu	Ile	Ser	Lys	Lys	Arg	Tyr	Ala	Gly	Leu	Leu	Phe	Ser	Ser	Arg	Ser	805	810	815
Asp	Ala	His	Asp	Lys	Met	Asp	Cys	Lys	Gly	Leu	Glu	Ala	Val	Arg	Arg	820	825	830
Asp	Asn	Cys	Pro	Leu	Val	Ala	Asn	Leu	Val	Thr	Ser	Ser	Leu	Arg	Arg	835	840	845
Ile	Leu	Val	Asp	Arg	Asp	Pro	Asp	Gly	Ala	Val	Ala	His	Ala	Lys	Asp	850	855	860
Val	Ile	Ser	Asp	Leu	Leu	Cys	Asn	Arg	Ile	Asp	Ile	Ser	Gln	Leu	Val	865	870	875
																		880

Ile Thr Lys Glu Leu Thr Arg Ala Ala Ala Asp Tyr Ala Gly Lys Gln
 885 890 895
 Ala His Val Glu Leu Ala Glu Arg Met Arg Lys Arg Asp Pro Gly Ser
 900 905 910
 Ala Pro Ser Leu Gly Asp Arg Val Pro Tyr Val Ile Ile Gly Ala Ala
 915 920 925
 Lys Gly Val Ala Ala Tyr Met Lys Ser Glu Asp Pro Leu Phe Val Leu
 930 935 940
 Glu His Ser Leu Pro Ile Asp Thr Gln Tyr Tyr Leu Glu Gln Gln Leu
 945 950 955 960
 Ala Lys Pro Leu Leu Arg Ile Phe Glu Pro Ile Leu Gly Glu Gly Arg
 965 970 975
 Ala Glu Ser Val Leu Leu Arg Gly Asp His Thr Arg Cys Lys Thr Val
 980 985 990
 Leu Thr Ser Lys Val Gly Gly Leu Leu Ala Phe Thr Lys Arg Arg Asn
 995 1000 1005
 Cys Cys Ile Gly Cys Arg Ser Val Ile Asp His Gln Gly Ala Val
 1010 1015 1020
 Cys Lys Phe Cys Gln Pro Arg Glu Ser Glu Leu Tyr Gln Lys Glu
 1025 1030 1035
 Val Ser His Leu Asn Ala Leu Glu Glu Arg Phe Ser Arg Leu Trp
 1040 1045 1050
 Thr Gln Cys Gln Arg Cys Gln Gly Ser Leu His Glu Asp Val Ile
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 Cys Thr Ser Arg Asp Cys Pro Ile Phe Tyr Met Arg Lys Lys Val
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<220>

<221> CDS

<222> (1)..(3318)

<400> 88

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Met	Asp	Cys	Lys	Arg	Arg	Gln	Gly	Pro	Gly	Pro	Gly	Val	Pro	Pro	Lys	
1				5				10					15			

cgg	gct	cga	ggg	cac	ctc	tgg	gat	gag	gac	gag	cct	tcg	ccg	tcg	cag	96
Arg	Ala	Arg	Gly	His	Leu	Trp	Asp	Glu	Asp	Glu	Pro	Ser	Pro	Ser	Gln	
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ttt	gag	gcg	aac	ctg	gca	ctg	ctg	gag	gaa	ata	gag	gct	gag	aac	cgg	144
Phe	Glu	Ala	Asn	Leu	Ala	Leu	Leu	Glu	Glu	Ile	Glu	Ala	Glu	Asn	Arg	
		35					40					45				

ctg	cag	gag	gca	gag	gag	gag	ctg	cag	ctg	ccc	cca	gag	ggc	acc	gtg	192
Leu	Gln	Glu	Ala	Glu	Glu	Glu	Leu	Gln	Leu	Pro	Pro	Glu	Gly	Thr	Val	
	50					55				60						

ggt	ggg	cag	ttt	tcc	act	gca	gac	att	gac	cct	cgg	tgg	cgg	cgg	ccc	240
Gly	Gly	Gln	Phe	Ser	Thr	Ala	Asp	Ile	Asp	Pro	Arg	Trp	Arg	Arg	Pro	
65					70				75						80	

acc	cta	cgt	gcc	ctg	gac	ccc	agc	acg	gag	ccc	ctc	atc	ttc	cag	cag	288
Thr	Leu	Arg	Ala	Leu	Asp	Pro	Ser	Thr	Glu	Pro	Leu	Ile	Phe	Gln	Gln	
				85					90					95		

ctg	gag	att	gac	cac	tat	gtg	ggc	tca	gca	cca	ccc	ctg	cca	gaa	ggg	336
Leu	Glu	Ile	Asp	His	Tyr	Val	Gly	Ser	Ala	Pro	Pro	Leu	Pro	Glu	Gly	
			100					105					110			

ccc	ctg	cca	tcc	cgg	aac	tca	gtg	ccc	ata	ctg	agg	gcc	ttt	ggg	gtc	384
Pro	Leu	Pro	Ser	Arg	Asn	Ser	Val	Pro	Ile	Leu	Arg	Ala	Phe	Gly	Val	
		115					120					125				

acc	gat	gaa	ggc	ttc	tcc	gtc	tgc	tgc	cac	ata	cag	ggc	ttt	gcc	ccc	432
Thr	Asp	Glu	Gly	Phe	Ser	Val	Cys	Cys	His	Ile	Gln	Gly	Phe	Ala	Pro	
	130					135					140					

tac	ttc	tac	acc	ccc	gcg	cct	cct	ggt	ttt	ggg	gcc	gag	cac	ctg	agt	480
Tyr	Phe	Tyr	Thr	Pro	Ala	Pro	Pro	Gly	Phe	Gly	Ala	Glu	His	Leu	Ser	
145					150					155					160	

gag	ctg	cag	cag	gag	ctg	aac	gca	gcc	atc	agc	cgg	gac	cag	cgc	ggt	528
Glu	Leu	Gln	Gln	Glu	Leu	Asn	Ala	Ala	Ile	Ser	Arg	Asp	Gln	Arg	Gly	
				165				170						175		

ggg	aag	gag	ctc	tca	ggg	ccg	gca	gtg	ctg	gca	ata	gag	cta	tgc	tcc	576
Gly	Lys	Glu	Leu	Ser	Gly	Pro	Ala	Val	Leu	Ala	Ile	Glu	Leu	Cys	Ser	
			180					185					190			

cgt	gag	agc	atg	ttt	ggg	tac	cac	ggt	cat	ggc	cct	tct	cca	ttt	ctc	624
Arg	Glu	Ser	Met	Phe	Gly	Tyr	His	Gly	His	Gly	Pro	Ser	Pro	Phe	Leu	

195	200	205	
cgc atc acc ctg gca cta ccc cgc ctt atg gca cca gcc cgc cgc ctt Arg Ile Thr Leu Ala Leu Pro Arg Leu Met Ala Pro Ala Arg Arg Leu 210 215 220			672
ctg gaa cag ggt gtc cga gtg cca ggc ctg ggc acc ccg agc ttc gca Leu Glu Gln Gly Val Arg Val Pro Gly Leu Gly Thr Pro Ser Phe Ala 225 230 235 240			720
ccc tac gaa gcc aac gtg gac ttt gag atc cgg ttc atg gtg gat gct Pro Tyr Glu Ala Asn Val Asp Phe Glu Ile Arg Phe Met Val Asp Ala 245 250 255			768
gac att gtg gga tgc aac tgg ttg gag ctg cca gct gga aag tac gtt Asp Ile Val Gly Cys Asn Trp Leu Glu Leu Pro Ala Gly Lys Tyr Val 260 265 270			816
cgg agg gcg gag aag aag gcc acc ctg tgt cag ctg gag gtg gac gtg Arg Arg Ala Glu Lys Lys Ala Thr Leu Cys Gln Leu Glu Val Asp Val 275 280 285			864
ctg tgg tca gat gtg atc agt cac cca ccg gag ggg cag tgg cag cgc Leu Trp Ser Asp Val Ile Ser His Pro Pro Glu Gly Gln Trp Gln Arg 290 295 300			912
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gcc atg gac cct gac gtg atc acc ggc tac aac att cag aac ttt gcc Ala Met Asp Pro Asp Val Ile Thr Gly Tyr Asn Ile Gln Asn Phe Ala 385 390 395 400			1200
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Pro Phe Leu Gly Arg Val Thr Gly Leu Arg Ser Asn Ile Arg Asp Ser	
420 425 430	
tcc ttc caa tca agg cag gtc ggc cgg cgg gac agt aag gtg atc agc	1344
Ser Phe Gln Ser Arg Gln Val Gly Arg Arg Asp Ser Lys Val Ile Ser	
435 440 445	
atg gtg ggt cgc gtt cag atg gat atg ctg cag gtg ctg ctt cgg gaa	1392
Met Val Gly Arg Val Gln Met Asp Met Leu Gln Val Leu Leu Arg Glu	
450 455 460	
cac aag ctc cgc tcc tac acg ctc aac gct gtg agt ttc cac ttc ctg	1440
His Lys Leu Arg Ser Tyr Thr Leu Asn Ala Val Ser Phe His Phe Leu	
465 470 475 480	
ggc gag cag aag gag gac gtt cag cac agc atc atc acc gac ctg cag	1488
Gly Glu Gln Lys Glu Asp Val Gln His Ser Ile Ile Thr Asp Leu Gln	
485 490 495	
aat ggg aac gaa cag acg cgc cgc cgc ctg gcc gtg tac tgc ctg aag	1536
Asn Gly Asn Glu Gln Thr Arg Arg Arg Leu Ala Val Tyr Cys Leu Lys	
500 505 510	
gac gcc ttt ctg cca ctc cga cta cta gag cgc ctt atg gtg ctg gtg	1584
Asp Ala Phe Leu Pro Leu Arg Leu Leu Glu Arg Leu Met Val Leu Val	
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aat aat gtg gag atg gcg cgt gtc acg ggt gta ccc ctt ggg tac ctg	1632
Asn Asn Val Glu Met Ala Arg Val Thr Gly Val Pro Leu Gly Tyr Leu	
530 535 540	
ctc acc cgg ggc cag cag gtc aag gtc gtg tct cag ctg ctg cgc cag	1680
Leu Thr Arg Gly Gln Gln Val Lys Val Val Ser Gln Leu Leu Arg Gln	
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Ala Met Arg Gln Gly Leu Leu Met Pro Val Val Lys Thr Glu Gly Ser	
565 570 575	
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Glu Asp Tyr Thr Gly Ala Thr Val Ile Glu Pro Leu Lys Gly Tyr Tyr	
580 585 590	
gac gtc ccc att gcc acc ctg gac ttc tcc tcc ttg tac cca tcc atc	1824
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